

Chairman's Award - Team 5422

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2022 - Team 5422

Team Number

5422

Team Nickname

Stormgears FRC

Team Location

Westford, Massachusetts - USA

Describe the impact of the *FIRST* program on team participants within the last 3 years. This can include but is not limited to percentages of those graduating high school, attending college, in STEM careers, and in *FIRST* programs as mentors/sponsors.

We provide an environment for channeling creativity, resulting in award-winning student-designed tank drives and sensor control systems. 100% of our alumni have graduated high school, 91% have chosen STEM careers, and many come back as mentors. The impact of our FIRST program aims to continue beyond FRC: alumna Serena Beri hosts a STEM for Girls by Girls show on our local news. Through student-led international workshops, our members gain planning, presentation, and teaching skills too.

Describe your community along with how your team addresses its unique opportunities and circumstances.

Our members come from several local towns without school-run FRC teams. In 2020, we lost our 6000ft² industrial space sponsor and recently moved into a 1500ft² office suite. To interact with our multi-town community, we have showcased our robot & "FLL in a box" kits at 46 community events, reaching 12,000+ people in total. We partner with local organizations such as after-school coding centers, cub/girl scout troops, & church groups, which come from the many towns that make up our team.

Describe the team's methods, with emphasis on the past 3 years, for spreading the FIRST message in ways that are effective, scalable, sustainable, and creative. How does your team measure results?

We've created a scalable platform, STEAMSplash, to make STEAM & FIRST globally accessible. Over the past year, we have made considerable progress in developing and expanding STEAMSplash. It has reached underprivileged communities in over 40 countries with over 200 registered users (90% of content made by the team). We have also used STEAMSplash to work in partnerships with local clubs/organizations such as the Boys and Girls Club in Lowell, Girls Who Code in Littleton, Star Hacks, and Hack3.

Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.

Our team has placed a large focus on global outreach since the beginning, reaching Rwanda, Kenya, Ghana, & Argentina. The Jains family went to work with kids in Rwanda, encouraging Jazmin and Lara to mentor 2 FLL teams in Argentina. We inspired an FLL team, the Pajama Llamas, to create Core Values videos on STEAMSplash. Our safety captains have connected with other captains around the world via social media, many of which now have started initiatives themselves.

Describe your team's initiatives to Assist, Mentor, and/or Start other *FIRST* teams with emphasis on activities within the past 3 years.

Each year, we conduct Open Houses for potential members and rookie teams. We also hosted a 2020 Week 0 event and FLL scrimmages annually. Our Jr. FLL-in-a-Box kits provide the materials needed for teachers to run STEAM courses for younger learners. By mentoring & assisting 18 FLL and Jr. FLL teams locally & globally, we inspired a new generation of FIRST teams. This included an underprivileged team from India winning the Project Award & a team from Argentina going to Worlds.

Beyond starting teams, what initiatives have you done to help inspire young people to be science and technology leaders and innovators? What results have you seen from your efforts in the past 3 years?

Our STEAMSplash initiative allows kids all around the world to immerse themselves in STEAM. It includes "FLL In a Box" startup kits with hands-on exercises for aspiring Jr. FLL & FLL teams, and a web platform to reach remote locations. We are a team from many different towns and we regularly introduce FIRST at the schools within our communities.

Describe the partnerships you've created with other organizations (teams, sponsors, educational institutions, philanthropic entities, etc.) and what you have accomplished together with emphasis on the past 3 years

We are grateful for the support of our corporate sponsors. We began by canvassing local companies. Currently, we have 11 sponsors, with a 92+ % retention rate. SMC Ltd. has been one of our integral sponsors, providing experienced mentors, tools & materials. Solidworks provides us with software licenses. We add new sponsors every year - Johnson Controls & PMD in 2019, SGPS/Showrig & Rockwell Roofing in 2021, and this year adding Boxer Properties who have donated 1500 ft2 of space at low cost.

Describe your team's efforts in the past 3 years to promote equity, diversity, and inclusion within your team, *FIRST*, and your communities.

Having members from multiple ethnicities & backgrounds, we value the promotion of DEI. In current times, the importance of appreciating everyone's individuality is essential and Stormgears FRC recognizes that. Along with having discussions on the topic of DEI, we have included an extra section in our team contract for members to verify they understand the expectations in regards to DEI. To this day, we are finding exciting ways to appreciate the uniqueness of our team & community!

Explain how you ensure your team and the initiatives you have created will continue to run effectively for the foreseeable future

Through our STEAMSplash initiative, we have created a sustainable way to continue spreading STEAM. Our team is constantly adding to our content and looking for more ways to spread our lessons in STEAM to organizations worldwide. Older team members also train younger ones on how to maintain and add to STEAMSplash, allowing it to function effectively for the foreseeable future. Many members on our team also come from FLL teams under our umbrella, ensuring new members each year.

Describe your team's innovative strategies to recruit, retain, and engage your sponsors within the past 3 years

Many of our sponsors are recruited by parents, but student efforts keep them coming back by providing updates and inviting them to events like Week 0. We have strong relationships with our sponsors: SMC, Analog Devices, NetScout, and Raytheon have supported us all 6 years. We gain valuable design process insight at Netscout workshops each year and in return, help during their Hackathon. We attend Analog Devices' annual General Technical Conference and Rockwell Automation's Engineering Day.

Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.

Finding a fair work balance for all students has always been a struggle for our team. We have returned to in-person meetings in our brand-new space. After being virtual, we lost many members due to the fact that we couldn't build robots. This year, our team is focused on rebuilding. This year alone 24 new members joined our team due to our annual open house and our FLL teams. We're now focused on encouraging new members to connect as a team to build lasting relationships our team has always had.

Describe your team's goals to fulfill the mission of *FIRST* and the progress you have made towards those goals.

Our mission is to inspire, mentor, sponsor, and educate students locally & globally in various areas of STEAM, using FIRST as a framework. This aligns with the FIRST vision and serves as goalposts in all that we do. We mentor FLL teams, with two all-girl teams having qualified for Worlds. This year, we held an FLL scrimmage for the fourth time. We had 8 different teams attend, 4 of which were new teams. And we educate with our STEAMSplash virtual platform.

Briefly describe other matters of interest to the *FIRST* Judges, including items that may not fit into the above topics. The judges are interested in learning about aspects of your team that may be unique or particularly noteworthy.

Our team is uniquely sustainable in all aspects. Each year our seniors mentor younger students so that we seamlessly fill the leadership roles that they leave behind. Some of our alumni come back as mentors to share their experiences with the team. We also have a very high team membership rate each year, due to the amount of FLL teams we mentor/start.

We introduce our FLL teams to FRC and many join FRC in the second half of their 8th grade year to continue their journey with FIRST.

Essay

We're the Stormgears and we're revving up for takeoff, spreading inspiration wherever we go, resulting in a high-achieving, award-winning, role model team. Together, we create robots, partner with sponsors, & propel STEAM in local & global communities.

After learning that the remainder of the 2020 season was canceled, our team received even worse news. SMC Ltd., a medical manufacturer, our space host since 2016, would no longer be able to house us due to COVID. A year ago, we searched without success for a new space to meet, build, & collaborate. To overcome this turbulence, we downsized from a 6000 sq.ft industrial workspace to a 1500 sq.ft office suite. We lost many of the luxuries we had including a complete practice field. We struggle to fund our team's expenses now that we must include rent & Wi-Fi (\$10K) into our budget. In our new home, we remain dedicated to the Stormgears doctrine: to inspire students locally & globally with STEM, using FIRST as a framework.

STUDENTS, INSPIRING OTHER STUDENTS

Our journey took off in 2014 with a group of FLL students at the World Championships. Inspired by FRC robots & teams, these students created Stormgears. Today technical subteams are guided by mentors, but each is led by veteran students who train younger members to become next year's pilots. We have training meetings year-round to get new members ready to hit the runway. This generates a sustainable cycle of engineering wisdom.

We know how fortunate we are to be on a FIRST team & are motivated to share these benefits with our community; we've mentored & assisted robotics teams locally and internationally. The FLL teams under our wing sustain our legacy. In fact, 67% of the students on our team joined after belonging to FLL teams. We've mentored an FLL team in Argentina that won the championship & went to Worlds. Our impact is global.

Stormgears emphasizes advocating for those who are underrepresented in STEAM fields. One of our most significant accomplishments is our mentoring of 2 all-girls FLL teams that qualified for the World Championship. We help young women cultivate confidence & technical excellence, which inspires them to continue with FIRST & join FRC.

Our Chairman's and Safety teams are 100% student-led. Our electrical & safety subteams are led by 2 female co-captains. Safety's leadership was vital to the team winning safety awards at 2 district competitions & in Detroit, 2019. We have girls in every subteam, with 5 of them as captains.

We conducted a team survey, and the number of girls/nonbinary members on our team has increased from 1 in our first year to 14 this year. Our team celebrates ethnic & economic diversity while prioritizing LGBTQ+ inclusion, as 1/4 of our team is a part of the community. Also, 100% of our team is interested in pursuing a STEM major.

ROBOTS, INSPIRING INNOVATION

Our runway is able to withstand all landings. We've developed a strong technical foundation which establishes us as leaders in design & controls. Despite our inability to access our robot during Covid, our team competed in the 2021 Innovation project, qualifying for semi-finals, and concurrently competed in the Game Design challenge. While we take pride in competing, Stormgears believes that collaboration is the true message of FIRST. We've published 3 white papers on our subsystems which are free & accessible for any team to use.

We continue to use our award-winning StormNet, a sensor board designed by our team. We've used the sensor board to convert sensor outputs to a machine readable format since 2017. We have recommended the use of StormNet to other teams as there's no comparable alternative that operates as efficiently & with ease as our sensor board.

In 2021, we took part in the Dassault Systemes' Living Heritage project creating a 3D representation of the Colosseum using xDesign that was then rendered into VR.

MENTORS, INSPIRING EXCELLENCE

Our flight isn't possible without our mentors. They fuel us with both technical & non-technical guidance, supporting us through the turbulence of losing our workspace. Over the summer, mentors host CAD Design, Motors 101, machining, & business plan development workshops. During the build season, mentors both train and inspire us to lead, learn and innovate in technical and non-technical areas. Our mentors are diverse as well: they reflect our different ethnic backgrounds & many are female professionals who serve as role models.

ENTREPRENEURSHIP, INSPIRING INITIATIVE

Our passion for STEM combined with our cargo hold of resources has opened the gates for our STEAMSplash product suite. Originating as a simple set of activities to promote engineering, STEAMSplash is now a scalable product spreading the message of FIRST throughout the world. Our platform took off when we introduced FIRST to hundreds of company executives & school superintendents at the LearnLaunch EdTech Conference.

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We distributed FLL & Jr. FLL in-a-box kits to Kenya & Rwanda providing hands-on experiences from FLL inspired challenges. These kits detailed project guides & learning plans to help educators stay organized. We've evolved to a web platform to distribute STEAM content, enabling us to sustain our global presence. Users can learn & apply STEAM concepts through engaging videos, lesson guides, quizzes, & assignments compiled on one digital platform. The website has FLL themed courses promoting an interest in FIRST principles, including a unique teamwork course presented by our FLL team, the Pajama Llamas.

Due to the pandemic & loss of our workspace our robot was stored until Stormgears could find a new home. Because we had no access to our robot or our industrial power tools, we focused our energy on expanding STEAMsplash even further. We've worked with content providers such as a Girls who Code team, & a Young Inventors Program to instill a passion for STEM in a new generation. We've worked to build our user base by hosting a Scout Fair to craft personalized STEAM content for Girl Scouts. This year we designed a course to teach students & other teams the fundamentals of FRC. Each subteam created instructional videos on a range of topics providing baseline internal training as well as content we could share with other teams. Through this course we hope to connect with FRC teams across the world & develop our platform to spread FIRST principles.

Currently, we have hundreds of STEAMsplash users from over 40 different countries. We hope to leverage STEAMsplash as a scalable mechanism to ensure the sustainability of our team. Stormgears is working tirelessly to create, test, & upload original content to manifest STEAMsplash around the globe.

GLOBAL OUTREACH, INSPIRING UNDERPRIVILEGED KIDS

Using FIRST programs, we've built connections around the world in Rwanda, Argentina, Kenya, & Ghana. We promote STEAM in underprivileged areas by conducting robotics workshops, assisting & mentoring rookie teams, providing supplies, & raising funds. Our global outreach is focused on creating sustainable opportunities for kids in underprivileged communities.

In the summer of 2019 we made a pit stop in Rwanda, & partnered with Solidworks to conduct workshops for a local school. To develop & maintain a sustainable global presence, we establish relationships with organizations & schools. For example, we're working with Kidz Vision Academy in Ghana to build an engineering club centered around FIRST. We worked with the Grace Church Group to create a robotics program in Kenya. Finally, we worked with an Argentinian public school to mentor the FLL team Flecha Cosmica. In 2020, the school created Convergencia 26, whom we mentored.

COMMUNITY, INSPIRING "STEAM"

In only 8 seasons, we've reached 12,000+ people across 43 outreach events. We've showcased FIRST & our robots at 4 high schools that don't have FRC teams. After inviting Steve Cremer to a STEM fair, we encouraged a local high school to start their own FIRST program. We participate in local events like parades & community races. We've hosted valuable FLL scrimmages for the past two years, with this year having 8 teams attend. Annually, we host a Scout Fair for over 50 scouts in a partnership with Netscout. This year we organized a virtual scout fair to help scouts earn their robot merit badges online.

Stormgears has assisted or mentored 18 Jr. FLL & FLL teams in our local community in the past 3 years. Stormgears has conducted open houses each year, reaching out to potential rookie teams, sharing experience & advice. This year our open house was important in building the runway for our team after the virtual year in 2021. We recruited students from many FLL teams we mentor, which have become a sustainable resource to growing our team each year.

We hosted a Week 0 Event for the 2020 season. After constructing a full field, we welcomed 4 other FRC teams to participate in scrimmages. Aligning with FIRST values of Gracious Professionalism, we exchanged advice, knowledge, & spare parts. We invited local FRC teams to use our practice field for the remainder of the season.

SPONSORS, INSPIRING ENGAGEMENT

Our sponsors are more than corporate donors, they are powerful partners that navigate us towards achievement. Our most crucial sponsor is SMC Ltd which formerly hosted us at their facility from 2016 to 2020, & continues to sponsor us financially. We have a unique partnership with our sponsor NetScout: we collaborate to plan a Hackathon and scoutfair every year. Stormgears participates in Rockwell Automation's Engineering Day by leading STEAM & safety activities for employees' children. At the Solidworks DEKA group, we talked to executives about how they can support FIRST teams. Each subteam drives us to success. Together, these elements ensure a dynamic & sustainable team promoting a passion for STEM & equipping the youth to reach new altitudes. We aim to uphold & expand the FIRST legacy for years to come, so that we can propel forward into the future of Stormgears.